Developing the Regional Innovation System – Business Development Laboratory as a Promoter of Science-Based New Ventures

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Abstract

Innovations have been seen as the key factor for the European Union economies to survive in international competition (see Lisbon agreement etc.). Consequently, there are many programmes and policies encouraging universities' participation in international, national and regional innovation systems.

There are currently various schemes, programmes, assisting organisations and guidance services for new venture creation in Finland and in the Turku region. However, the Finnish paradox in innovation is that while the country has actively invested in research, development and technology, the output has been very modest (a few science-based companies, entrepreneurship scores low among educated Finns). Consequently, according to our recent study on industry-academia collaboration (Malinen et al. 2005) there are problems in the Finnish innovation system. The paper concentrates on two of the problems negatively impacting new ideas and innovations coming from the university sector to the innovation pipeline: firstly, growth and internationalisation of new innovations have been very moderate due to the limited number of potential innovations in the first place and, secondly, due to the limited understanding and capabilities for commercialising new ventures.

In this context, the paper presents a case study of a recently founded Business Development Laboratory activity as a vehicle and promoter of increased flow of new science-based ventures into the innovation system. The paper also offers suggestions for other organisations assisting science-based businesses.

JEL classification codes: L26, M53, O31, O32
Keywords: Innovation, entrepreneurial training, innovation system

"Inventions have long since reached their limits, and I see no hope for further developments," Roman engineer Julius Sextus Frontinus, 10 C.E.

"When an inventor in Silicon Valley opens his garage door to show off his latest idea, he has 50% of the world market in front of him. When an in inventor in Finland opens his garage door, he faces three feet of snow." J.O. Nieminen, CEO of Nokia Mobira, 1984

1. Introduction

As we move further towards a knowledge-based economy, the role of universities is being widely reviewed. The growing number of public rankings and accreditations is but one phenomenon. Traditionally, universities have been autonomous, publicly funded organisations. Today, the university sector is facing external and internal pressures to change. Externally, diminishing public funding and productivity pressures are affecting the university sector. Internally, universities are looking for additional income from industry. The role of university management will be essential in the future of universities during the 21st century (see Malinen and Toivonen 1998).

The measures used in rankings indicate that a paradigm change is already under way. Many measures focus on what happens outside the university. The quality of scientific research is still, of course, highly appreciated, but innovative application of new knowledge for creating new businesses and making established ones more successful has also become a serious and essential ingredient of a successful university.

The European Union (EU) recognised this development in the Lisbon Declaration that aimed at making Europe the most competitive economic region in the world by 2010. Later, of course, the declaration has been adjusted but the basic message remains the same: Europe needs a more effective innovation environment and universities are expected to become major players in it.

In this paper, we present a tool developed by the authors for enhancing the regional innovation system by introducing the Business Development Laboratory (BDL) of Turku School of Economics (TSE). The paper discusses both the regional innovation system development and uses a case methodology to present a novel way to promote the formation of new technology-based ventures. The paper ends with conclusions and practical implications.

Today, Finland has 20 universities representing all parts of the country, from the polar circle in the North to the Southern coast. In addition, Finland has 28 polytechnics, also called universities of applied sciences, spread across the country. The motivation behind this proliferation has been based on regional policy.

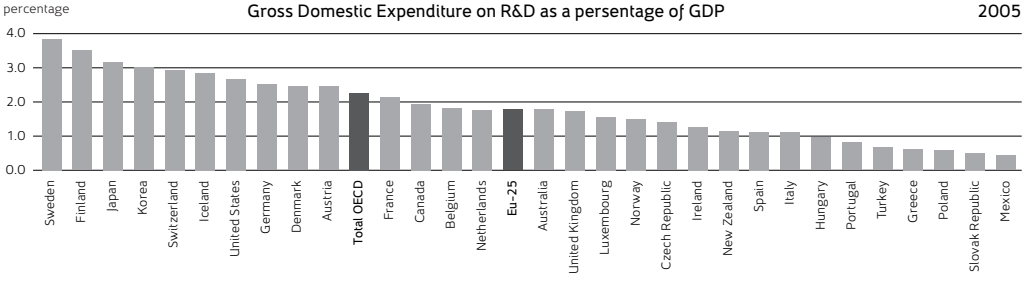
The Turku region, located in the South-west corner of Finland, has three universities, the biggest polytechnic in Finland and many research units of various organisations. The universities are the Turku School of Economics, University of Turku (dating with interruptions back to 1640) and Åbo Akademi University, which is the only multidisciplinary university in Finland that provides education in Swedish, the other official language in Finland. Today, there are more than 25,000 students and 400 professors in the area, and some 200 doctoral dissertations are submitted annually. Therefore, there are both history and new potential present in the area.

Pressures for change for the local university sector are emphasised by the Ministry of Education as there are increasing pressures to merge the existing independent universities.

The University of Turku and Turku School of Economics will join forces at the beginning of 2010. It was announced that the merger would result in a top-quality international research university. However, by announcement alone a university cannot reach top international quality. Concrete measures (outside of the system, peer review etc.) and suitable plans need to be carried out.

The new millennium, also in Finland, has increased the importance of discussion as to how universities should be changed to meet the increasing demands of competitiveness. The regional policy from the 60s to 90s was based on the assumption that any university unit in the region has a favourable catalytic role for development. Universities were also seen as producers of basic theoretical research that is then brought forward by means of more practical R&D. The R&D would be carried out in special technical research institutions, and also in larger industrial companies. Finland adopted in the early 80s a goal to increase R&D spending to a top level in the world. This has also taken place (see Figure 1 below).

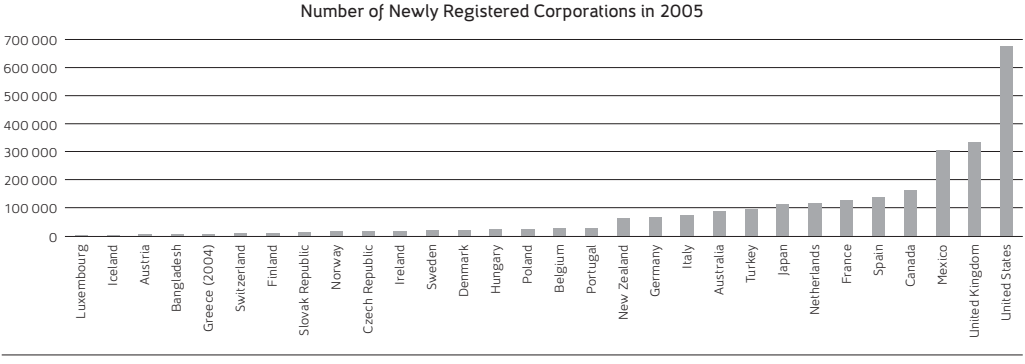
Figure 1. R&D Expenditure in Various Countries and Country Groups, % of GDP



Source: OECD main economic indicators No. 43, 2006/2.

The R&D spending in Finland is very high, indeed. But if we look at the business start-up rate, the picture is not nearly as favourable (see Figure 2). This is demonstrated well, for example, by the statistics of 2005.

Figure 2. Birth Rate of Start-ups in Some Industrialised Countries in 2005



Source: Klapper 2008.

2. Innovation Systems

In many countries Innovation system activities have followed the development of the US based initiatives, such as Silicon Valley and Route 128. National and regional innovation systems were developed in order to produce more science-based ventures, to help and support the existing (growth) businesses, and to co-ordinate the actions of various participants in the system (see Saxenian 1994; Brännback et al. 2006). Cooke (2005) notes that the interest of innovation systems and related issues was very high in the academic as well as policy oriented literature between 1987 and 2002. During that period more than 200 studies were published on innovation systems. Another notion can be presented. Most of the literature covered those institutions that are at the core of an innovation system. Those institutions include companies, universities, research organizations, and support systems that aim at generating innovations (Niosi 2002).

An innovative system is based on three different components: 1) substance factors (industry- or business-specific knowledge and skills), 2) structural factors (facilitating and enabling environment/infrastructure), and 3) dynamic factors (interactive processes within networks). The innovative systems can also be divided into national, regional, and local innovation systems (Smedlund et al. 2005). Vinnova (Swedish Governmental Agency for Innovation Systems) has introduced a model called Triple Helix for innovation systems. Triple Helix consists of university, government, and industry involvement (see Etzkowitz & Leyesdorff 2000).

While the innovation systems are being developed new approaches and new ways of organising science-based businesses are being recognised. Examples of new types and approaches are for example to be seen in biotechnology (Pisano 2006), design-based businesses (Utterback et al. 2006), or in a more general way the topics are discussed by Chesbrough (2003 & 2006), Gladwell (2002 & 2007), and Johansson (2006). Another new stream of literature is about how to survive and grow in the "open innovation environment" (see Christensen & Raynor 2003; Heath & Heath 2007; Livingston 2007). Therefore, the innovation system itself is undergoing change, which calls for new ways of organising the innovation activities.

The Finnish innovation system has been systematically built since 1979 when the national technology committee was established. This was followed by several other very important actions of which the foundation of the National Technology Agency, Tekes, in 1983 and the launch of technology programmes the following year are the key milestones. The first science park was created in 1982 and a quarter of a century later there are 22 technology and science parks in Finland. The Science parks are government initiatives forming regional agglomerations where scientific and educational institutions can effectively interact with the existing firms and provide efficient seed-beds for start-up technology and science based firms. Accordingly, in the Finnish regional innovation system we find that in the close proximity of the approximately 22 science and technology centres we have 20 universities with 173,000 enrolled students and around 20,000 new students enrolling annually. Additionally, there are 28 polytechnics with a total number of 133,000 students and enrolling 34,000 new students annually (Finnish Science and Technology Information Service 2008). As a key part in the efforts to build the Finnish innovations system, Finland has consistently invested in higher education. As a percentage of GDP, Finland being at roughly 6.5%, only Denmark, Sweden and Cyprus have higher public expenses on education. Hence 32% of the total population have an academic degree and approximately 38% of the population between 24-35 years have an academic degree. As a result, there is an abundance of knowledge-based resources.

To ensure competitiveness the system of science parks is currently revised its objectives and goals in order to better meet future challenges. However, a striking paradox is that entrepreneurial prevalence is very low while the R&D expenditure is high and all of the various innovation system activities have been implemented (The Finnish Paradox). Explicitly, the national innovation systems are supposed to increase innovativeness. Implicitly, at least, it is assumed that entrepreneurial activity should also increase. However, in reality, attitudes towards starting a business are rather weak in Finland (see Figure 3).

Finland has clearly been an innovation-push type of country[1]. It is categorically assumed that technology is developed first and its commercialisation can then be carried out afterwards as a separate activity. Recent literature on innovations has emphasized the market-pull aspect. Markets, existing or potential, are as often the initiator for innovation as technology. As a matter of fact, these two aspects should be considered simultaneously (see for example Chesbrough 2003).

Universities are often regarded as major sources of new innovative knowledge, and therefore also as sources for new knowledge-intensive businesses. A recent study (Malinen et.al. 2006) revealed that the innovation environment in Turku, although strong in basic research, does not turn out new businesses to a satisfactory degree. Other findings of the study are as follows:

a) Inter-university problems – researchers are not implicitly encouraged to actively cooperate with industry. Due to increased national (Tekes) and international (EU) demand research institutions are becoming more active in university-industry collaboration (reactive vs. proactive approach?).
b Industry tends to stress immediate results from university research, which is often impossible and usually against the basic research ideology.
c) Changing intellectual property (IP) laws and regulations have made it difficult for all parties involved in collaboration to fully understand the nature of innovation property rights.
d) There are too few new ideas and innovations coming from the university sector to the innovation pipeline. Therefore, actors in the innovation system cannot select the most promising ones from a large pool of new ideas, but are forced to develop what they have been offered. Additionally, the setting in Finland at the moment is that either you are a researcher or you start your own company. You cannot do both. Larger research groups do not encourage their individual researchers to commercialise their research-based innovations. Consequently, a large number of potential ideas are not pursued further.
e) Commercialisation activities and support are weak.
f) Growth and internationalisation of new innovations have been very moderate due to a limited number of potential innovations in the first place and, secondly, due to the limited understanding and capabilities for commercialising new ventures.

1 Nokia has had an enormous effect on the Finnish economy: the size of its turnover equals the size of the Finnish annual national budget, one fifth of corporate tax revenues comes from Nokia, exports cover 20% of total Finnish exports etc. As an indicator, Nokia represents about 40% of all Finnish R&D&T investments. In Finland, Nokia is seen as the most innovative company, but a highly technology oriented one.

Figure 3. Attitudes towards Starting up a Company in Finland

Source: Flash Eurobarometer 160, 2004.

With this paper and with the BDL, we target our efforts to the points d), e), and f) presented above. To summarise our approach, we postulate the following barriers to successful innovation in universities:

- Knowledge creation does not have the necessary critical mass. Universities are too small to be competitive.
- Universities do not have good\strong enough international networks.
- Basic research on markets and business competence is not strong enough to balance basic research in technology.
- Applied research is too compartmentalised and interaction between business and technology inside the university is insufficient.

- Networking between knowledge-intensive businesses and universities is not strong enough and not strategic enough.
- The education system does not offer sufficient understanding of business to the best brains in science.
- Support for potential start-ups is not systematically organised inside the universities.

There are several ways of promoting new business formation on the educational sector. These include, for example, entrepreneurship education, entrepreneurial learning provision, entrepreneurship projects, industry-academia collaboration, business planning education, campus company programmes, enterprise clubs and competitions etc. In Finland, the innovation system participant organizations are more or less involved in some or all of these activities. Various programmes, training schemes, courses etc. have been introduced by many universities. There are also several merely detailed actions taken by many universities such as start-up simulations (Tegtmeier & Schulte 2008), mentoring programmes (St-Jean & Audet 2008; Wikholm et al. 2008), and introducing the outside curricula activities, such as Venture Cup integration, into the educational system.

3. Methods

The paper describes a recent case, the Business Development Laboratory programme. The programme is a business development programme for university researchers of the University of Turku with the aim of creating a business plan to commercialise a university based invention. The course is new for the Business students of the Turku School of Economics and the Law students of the Faculty of Law of the University of Turku.

The authors are strongly involved in developing the BDL programme. The main research strategy of this study could be said to be the case study (on the case study see more e.g., Yin 1994; Gummesson 2000). As strong researcher involvement in the research process was required, the type of approach in this study could be called action research (Gummesson 2000; Gill 1986; Greenwood & Levin 1998).

Although action research is hard to define in a generic way, some accepted guidelines exist. One of the most used definitions is by Rapoport (1970), who describes action research as contributing *"…both to the practical concerns of people in an immediate problematic situation and to goals of social science by joint collaboration within a mutually ethical framework."*

Action research is often confused with applied research or even consulting; however, the definition above separates action research from applied research by stressing the need to contribute also to the goals of science. Public reasoning of results, typical of science, marks the difference between consulting and action research (Heikkinen & Jyrkämä 1999; Jönssön 1991; Stowell et al. 1997)

Susman and Evered (1978) add a third goal to action research, which is to develop the self-help abilities of people facing the actual problem situation. Learning from the possibilities and challenges and ways of solving problematic situations should be of prime importance to both the researcher and the people in a problematic situation. The researcher should be more like a catalyst, which sets the cyclical learning and problem solving in motion. The benefits to the organization under study are otherwise less than optimal if the removal of the catalyst (i.e. the closing of the research) means the end of the cyclical learning process.

Guidelines for an action researcher state that researchers should recognize that their theories and prescriptions for action are themselves the products of previous action. These theories and prescriptions are thus subject to re-examination and reformulation when entering every new research situation. Action researchers are also encouraged to collaborate on equal terms with clients. This also means that the learning should be a two-way process - participants learning from researcher and researcher learning from practitioners. Finally, action researchers are encouraged to adopt an interpretative and hermeneutic approach, although this makes action research somewhat vulnerable to positivist critics (Checkland 1991; Jönssön 1991; Stowell et al. 1997).

Since action research has multiple forms (see Table 1), in the next paragraphs we illustrate the research process and researcher roles in detail.

Table 1. Characteristics Analysis of Action Research Forms

	Process model			Structure		Typical involvement			Primary goals			
	Iterative	Reflective	Linear	Rigorous	Fluid	Collaborative	Facilitative	Experiment	Organizational development	System design	Scientific knowledge	Training
Canonical	•			•		•			x		x	
IS proto-typing	•			•		+	+			•		
Soft systems	•				•		•		x	x		
Action science		•			•		•		x		x	
Participant observation		•			•			•			•	
Action learning		•			•			•				•
Multiview			•	•		+	+	+		•		
ETHICS			•	•		•			x	x		
Clinical field work			•		•	•			x		x	
Process consultation			•	•				•	•			

Key: • signifies a dominant characteristic, **+** (or) signifies characteristics that will dominate in different studies, **x** (and) signifies characteristics that may occur together in the same study

Source: Baskerville and Wood-Harper, 1998

The authors have studied the Finnish innovation system and the Turku area innovation system in particular. This has given them a comprehensive picture of the strengths and weaknesses of the Turku area innovation systems. The authors obtained an idea of a solution to some of the problems, and thus the idea evolved to the concept of the BDL programme. The concept was tested as the pilot BDL programme in the spring 2007. The participants of the pilot were interviewed and selected by the authors and they were involved in running the pilot programme. After the pilot the participants were interviewed. The experiences of the participants and the authors were analysed and the programme was modified accordingly. The BDL programme was run for the second time in the spring of 2008. Again the authors interviewed and selected the participants and were involved in running the programme.

Feedback was collected from the participants in the programme. The feedback of the pilot was collected by group discussion, in which both the students and the researchers were present. During the second round of the programme the feedback was collected by a feedback questionnaire. Twelve Business students out of 15 and one Law student out of four answered the feedback questionnaire. Nine researchers out of 14 replied to the feedback questionnaire. There was at least one researcher present at each business development case.

The feedback questionnaire covered the strengths, weaknesses and development suggestions of mentoring and coaching, evaluations, and team-work. Also the strengths, weaknesses and development suggestions of the concrete output for development of the new venture were asked by the questionnaire. The participants were also asked what they personally gained from the programme. The feedback discussion of the participants of the pilot team covered the same topics.

The authors had different tasks in the process. Prof. Malinen and Prof. Puhakainen have studied the innovation system. Project manager Hautala and Dr. Orava together with additional experts developed the concept of the BDL programme. Hautala selected the students, except the Law students, who were selected by the partners in the Faculty of Law. Hautala and Dr. Orava interviewed and selected the university researchers. The selection was assisted by a representative of the Turku Science Park. Prof. Malinen planned and taught in the intensive course included in the programme. Hautala, Dr. Orava and Prof. Malinen instructed and coached the teams developing the business plans. They also interviewed and discussed with participants during and after the programme.

Even though the authors had different tasks, they worked as a team and contributed to each other's tasks by discussing and giving feedback. These discussions and feedback were very useful for the modification of the programme during the process. The active participation of the authors in the process resulted in subjectivity, which is often characteristic of the action research method (Gummesson 2000). Overall, the process is best classified as action learning/action science (see Table 1).

4. Business Development Laboratory

The Business Development Laboratory (BDL) is a joint project of Turku School of Economics, University of Turku and Turku Science Park Ltd. The aim of the Laboratory is to support university research based new venture creation in the Turku area. The Laboratory also aims at raising the level of the business competence and the entrepreneurship awareness of the university researchers and students.

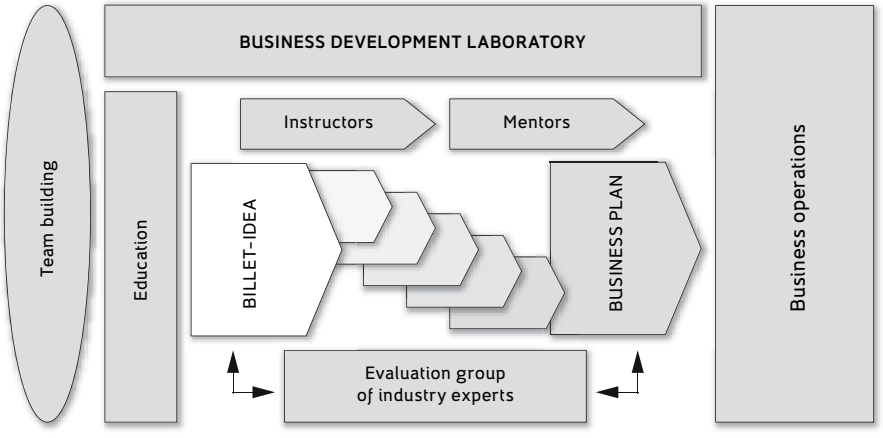
There are many programmes with similar aims and also activities other than the BDL. Two of the programmes were taken a closer view of as a source of inspiration. The Global Access Programme of UCLA Anderson School of Management has done cooperation with TEKES in business development of Finnish high technology growth companies. Dr. Orava, one of the authors, has participated in the programme as a graduate student. The Venture Cup Business Plan Competition is running throughout Finland and Europe. Some of the elements and characteristics of the programmes have influenced the development of the BDL, but the goal of the development has been to find a solution to the problems of the Finnish innovation system. This has brought distinct characteristics to the BDL programme.

The Business Development Laboratory was developed as a solution to the Finnish paradox in innovation, viz. while the country has actively invested in R&D&T (currently number 3 in the

world per capita) the output has been very modest (few science-based companies, entrepreneurship scores low among educated Finns). Moreover, the universities in Turku with high quality research should have generated larger numbers of science-based companies.

The characteristics of the innovation systems of the Turku area were carefully accommodated in the development of the BDL programme. The Laboratory initially focuses on the two strategic fields of the Turku municipal strategy; Life Science and ICT. In the future the programme will also be focused on other knowledge intensive industries. The Laboratory combines the different scientific expertise of the Turku School of Economics and the University of Turku, i.e. expertise in Business Science and Law, and also in technology; such as ICT and Life Science. This is a feature that distinguishes the BDL programme from many other similar programmes. Furthermore, the Laboratory uses the industry-specific business knowledge and the tacit knowledge of the professionals of the Turku Science Park Ltd. and other business partners. The programme emphasised the importance of facilitating the networking of the potential entrepreneurs with the public and private business service providers and investors in the Turku area.

Figure 4. The Concept of the Business Development Laboratory



Source: Authors' illustration

The programme has two target groups - university researchers and university students. It aims at supporting the commercialisation of the university research by offering researchers an opportunity to develop their business competence, to gain insight into the business opportunities of their research findings and to develop a business plan for the commercialisation of their invention or service concept. On the other hand, the programme offers the students a practical learning experience and an opportunity to acquaint themselves with a career in high technology SMEs. In addition, the programme also promotes entrepreneurship to both groups.

The Business Development Laboratory was piloted in the spring of 2007 and the concept was tested and refined with the help of one case. The business idea developed was from the field of Life Science. The first official programme of the Business Development Laboratory was held in the spring of 2008 with five business idea billets developed. Most of the business idea billets were ICT based product or service concepts, but two of the inventions were an environmental technology-based product concept and a media industry based service concept.

The Laboratory built up multidisciplinary teams, that developed a business concept based on a scientific invention. Natural Science or Technology researchers teamed up with two types of students in the laboratory: Business Administration students and Law students. Each of them brought their own knowledge into the team. The Natural Science or Technology researchers were from the University of Turku. The Business Administration and the Law students studied in the Master's programmes at the Turku School of Economics and in the Faculty of Law at the University of Turku, respectively.

The Business Administration and Law students were carefully selected based on their motivation, prior studies, and other merits. The need for broader knowledge in Business Administration was recognized in the teams developing their business concept. The natural science or technology researchers had an invention for the commercialization of which they needed the involvement of others. The Natural Science or Technology researchers were selected by their motivation, the commercial opportunities of their inventions and other related criteria. The recommendations of the professors were also used as a criteria in the selection process. The technology and industry specialists of the Turku Science Park assisted in evaluating the commercial opportunities of the inventions. The decisions of the student selection were made by the BDL staff and accepted by the Laboratory board consisting of professors of the universities and representatives of the Turku Science Park.

The goal of the BDL was to write a business plan for the selected cases. There was no prior business development done for most of the selected cases, but for two instances the initial commercial potential was studied by through the screening of possible markets and mapping the patent field. These studies were utilized in the programme. The researchers set the goal for their business development with the BDL staff before the beginning of the programme. All the researchers wanted to develop a business plan for a new venture, even thought the commercialization by licensing was also an option.

The Business Development Laboratory programme started with a two-day intensive business-planning course (see Table 2 below). The course provided the basic concepts and tools for planning the business activity of a start-up in a knowledge intensive business. The lecturers were a university professor specialized in knowledge-intensive business and entrepreneurship and business professionals of the industry partners.

After the two-day intensive course at the beginning, the teams started to develop a business plan for a start-up. The business concept was based on the invention of the Nature Science or Technology researchers of the teams. The first challenge for the students was to comprehend the technology behind the business concept well enough to understand the customer value of the technology. The work started by further defining the business ideas given by the researchers. The business students wrote the business plan together with the researcher. The marketing research was limited due to the limited time period of the programme and workload. The Law students concentrated on the intellectual property rights and ownership issues of the technology. The teams of the Business Development Laboratory had about 15 weeks to develop a science-based business and write a business plan.

Table 2. Overview of the Business Development Laboratory Programme

Event	Time
Business Plan Development Course (Two Day Course)	1st week
Return of the Business Plan Concept (A4)	2nd week
Feedback of the Business Plan Concept and Meeting with the BDL Staff	2nd week
Meetings with the Industry Mentors	3rd-9th week
Delivering the Elevator Pitch of the Business Plan Concept	10th week
Feedback on the Presentation from the Evaluation Group	10th week
Return of the Business Plan	14th week
Presentation of the Business Plan to the Evaluation Group	15th week
Announcing the Best Business Plan	15th week
Evening Gathering	15th week

Source: Business Development Laboratory Programme

During the development process the teams received personal mentoring by an experienced entrepreneur or an industry specialist who had business experience in the field of business related to the business concept to be developed. The mentors were carefully recruited from the business community in the Turku area. Also the BDL staff was involved in instructing the teams. The confidentiality of the work in the Business Development Laboratory was secured by agreements of secrecy of confidential information by all the parties involved.

Half way through the BDL programme, the teams exercised presenting an elevator pitch, a short selling presentation of their business concept. In most of the cases the business students held the presentations, but the whole teams were involved in planning the presentation. The presentations were evaluated and commented on by a business professional from the Turku Science Parks Ltd., a lecturer of Communication and a lecturer of Entrepreneurship.

The developed business plans were evaluated by an evaluation group at the end of the programme. The evaluation group consisted mainly of the business professionals of the business community. In the pilot study the university professors and staff were involved, but in Spring 2008 the evaluation group consisted of representatives of an investment company, Tekes and Turku Science Park and also a professor from Turku School of Economics and an entrepreneur. The evaluators had a chance to examine the plans beforehand and they could comment on the plan and the presentation at the presentation sessions. The evaluators also gave anonymous written feedback on the business plan.

The feedback of the business professionals was a very important feature of the programme as it evaluated the quality and feasibility of the business plans developed. It also gave the university researchers participating in the programme a good pointer on whether to pursue the business further.

The best-written Business Plan selected by the evaluation group was announced at the cocktail party at the end of the BDL programme in Spring 2008. The criteria emphasised the business planning done in the Business Development Laboratory rather than the commercial success of the invention. The best-written business plan was not selected in the pilot round.

5. Results of the Business Development Laboratory Programme

The experiences of the pilot round and the results of the first round of the Business Development Laboratory showed good results.

The students have found the BDL programme very interesting and fascinating, but also difficult. Sometimes the BDL staff felt that the main function of the coaching was to encourage the students to trust their skills. In the feedback the students valued the practical training in business development: "*I learned a systematic way to analyze the potential problems for developing a business*". For the majority of the students, this was the first time they had a chance to write a business plan. There are not many courses that integrate the different aspects of Business Administration. The students felt that this was a very good learning experience for them as future business professionals. The students valued the mentoring of business professional and it gave them new ideas and contacts, but the mentors also challenged them and their ideas: "*It gives you an idea of what you should be expecting in a future board room*." The feedback shows that the teamwork was also challenging for the students. The reason for this might be that the students had different educational backgrounds that caused them to look at the problems and solution from different viewpoints. The students were critical towards the evaluators of the business plans. We think the reason is that the students in many cases were faced by the harsh facts of business for the first time.

The BDL programme provided the university researchers a business plan based on their invention. In many cases the programme has worked as a feasibility or practice study in whether to start a new venture. The programme also gave them a wider perception of the business opportunities of their invention: *"[I gained] a much clearer idea of what is involved in starting up a company, and how a certain idea might be commercialized*." The feedback shows that the researchers also learned about the legal aspects of the commercialisation of their research. Since the researchers were involved in the business planning process with the students, we believe that they also learned about business planning: "*Now, in case I would ever need to do [a business plan] again for a different project it will be much easier".* The researchers also learnt the perspective and language used in business, which was unfamiliar to most of them. For many researchers the aspects of starting a business became clearer during the programme. It seems that the researchers fell into two categories. Some began pursuing the starting of the business. Others were more hesitant. This comes up also in the student feedback. The researchers were not meeting the mentors as much as the students. That was a disappointment for us. But the active researchers valued the contacts they made during the programme and saw the contacts useful in commercializing their research.

The pilot team and two other teams participated in the Venture Cup Business Plan Competition, which was partly running simultaneously with the BDL programme. The teams were able to participate in the second and the final phase of the competition. In 2007, the pilot team was given the honourable mention for the Turku area in the second phase and the business plan was selected as the best of the Turku area in the final phase. Next year one of the teams won the same awards, while the other team received the honourable mention for the Turku area in the third phase.

After the programme the researchers of the pilot team and three other teams have pursued to develop their businesses. They have been in contact with the business incubators of the Turku

Science Park. They also have utilized TULI financing[2] in order to purchase professional consulting services. The university researcher of the pilot case is about to start his company, but the business idea has been modified extensively.

There are some challenges in the Business Development Laboratory. Some of them are due to the early stages during the business idea billets work when the technological development of the product or service concept is in its early stage and the ownership of the invention and the company are not thoroughly considered. Also, many participants, both researchers and business students, have a very narrow view on the possible business models and related revenue logic(s). Basic value chain-based thinking with "we produce and sell"-kind of revenue logic was a common phenomenon. Many new business ideas used the "traditional business model" as their starting point. By this we mean that planned new science-based ventures tried to imitate the existing and traditional types of business models created by manufacturing or service companies. Also, most participants focus on one single revenue logic instead of thinking about revenue streams. In many cases, a new set of business models have been developed, which would be more suitable for science-based innovations. Copying the way a large multinational operates may not be the most suitable model.

Managing the business planning process was a big challenge for the students and they could not assess accurately the time needed for each phase of the business planning. The BDL staff should help the students to manage the process better in the future. According to the feedback, the students wanted more guidance in matters like budgeting and market research, which the Business students were expected to master. Unexpectedly, there were no communication problems between the university researchers, Business students and Law students, but it was difficult for the Business Students to see the legal side of a business issue and for the Law students the other way around as well. We do not see this as a problem of the programme, but as a feature of it, which gave a great learning opportunity for the students.

6. Conclusions/Implication

The Business Development Laboratory was developed as one solution for the Finnish paradox in innovation, which is also very apparent in the Turku area. There are universities of strong basic research in Turku, but it does not convert into a substantial number of new ventures and innovations. This is the very bottleneck of the Finnish innovation system, which BDL aims to grab. The BDL aims to get new inventions into the innovation pipeline.

The programme is built on the cooperation of the different actors in the Turku area innovation system. The Turku School of Economics together with the University of Turku and the Turku city owned Turku Science Park Ltd. are the initiators. In addition to the cooperation between the universities and the university-science park cooperation, the BDL has actively built a network with the service providers, such as consultant and attorney-at-law firms, and with the public and private investors. The university-industry cooperation is important to access and utilize the industry specified knowledge of the business professionals in the mentoring and evaluation processes of the BDL. The whole cooperation network of the BDL forms the Triple Helix of the innovation system.

[2] The TULI programme is funded by Tekes (the Finnish Funding Agency for Technology and Innovation). TULI aims to commercialize research results in Finnish universities and research institutes by helping researchers and research communities to evaluate the commercial potential of research-based inventions or ideas and aids in the process of their commercialization.

The goal of the BDL programme is to support the commercialisation of the university based inventions by improving the business competence of the participants, increasing awareness of commercial possibilities including entrepreneurship, and also enabling network building.

The university-industry cooperation also enables the participants to build valuable personal networks. The feedback of the participants also showed that they valued the possibility to build networks among the university and industry people. For example, the university researchers meet potential service providers, employees and partners. These networks might not be built without the BDL programme, because people too often socialize only among their cohort. There is network building not only among the researchers and students, but also among the other actors of the universities, support organisations and industry as well. The networks are helpful for the commercialisation of university research, but they can also lead other initiatives to improve and develop the local innovation system.

The BDL programme provides education in business development and new venture creation for the participants. The education is characterised by action learning methods. The programme covers both the business and legal issues of the development of research-based new ventures. The intellectual property laws and regulations are very important in knowledge-intensive business. Many of the university researchers do not have any studies in Business Administration and neither do they have much experience in business related issues. The programme provides a challenging practical training event for both the Business and Law students with a real-life business case and further develops their business competence. The students also obtain experience in entrepreneurship and new venture management.

The increased business competence and learning to see the research results from the market point of view leads to a wider perception of the business opportunities of the university researchers, and as a result, they start to see entrepreneurship as a career option. The programme also increases the entrepreneurial awareness among the university researchers and students. The starting up or working of a knowledge-intensive SME becomes one distinct career option.

We argue that one valuable outcome of the BDL is that it facilitates the universities' integration as a part of the innovation system. The BDL supports the commercialisation of the university research and helps the inventions get to the innovation pipeline. The programme contributes to building a more competitive university in Turku, which has a catalytic role for development of the community and also competitiveness of the local businesses. We believe that it has a positive effect on the entrepreneurial prevalence among the university researchers and students. We understand that the solving of the Finnish paradox also needs many other solutions.

We conclude that in order for the university to have a more substantial impact on the local innovation systems more university-industry cooperation is needed. The university needs research personnel who are able to see research from the industry perspective and are able to cooperate with the industry. The university should integrate more education in business competence into their curricula. Some training in Business Administration and also Intellectual property issues should be included in all doctoral studies. The university should further support the commercialisation of the research and also create means to motivate the researchers to commercialise. The Business Development Laboratory is a good vehicle in commercialisation of research, but more is needed.

The BDL concept can be internationalised. We are currently building similar programmes across Europe with various university partners. In the future, we will collect additional information in order to further develop the concept as well as increase the network of science-based company developers.

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